INTRAPARTUM MANAGEMENT OF TWIN GESTATION: WHAT IS BEST FOR THE SECOND AND THE SMALL?*

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AMONG first twins, low Apgar scores appeared to be related to low birth weight. Fifty percent of babies weighing below 1,500 grams were compromised at birth. Among second born twins, even higher weight group babies were compromised. Analyzing the data by mode of delivery, those delivered as an uncomplicated vertex delivery and weighing above 2,000 grams and all those babies, including very small ones delivered by cesarean section, did well. One third of small babies born by manipulative delivery were compromised at birth. Twice as many second born twins died as first born twins.

Hazards of twin delivery can be attributed to frequent malpresentation, most often by the second twin. When both twins present as vertex, vaginal delivery does not appear to increase perinatal morbidity and mortality in term infants. However, internal version and assisted or breech extraction delivery are clearly detrimental to twins weighing less than 2,500 grams. Cesarean section offers the best chance to twins in malpresentation of either twin and to those of very low birth weights.

Multiple pregnancies have been regarded with awe both socially and medically since ancient times. From an obstetrician's point of view, they pose a challenge both in diagnosis and management to ensure the well-being of the mother and both infants. Twin births have disproportionately high perinatal mortality and morbidity. Increased perinatal mortality is primarily due to low birth weight among infants as a result of both prematurity and intrauterine growth retardation. It is common knowledge that full-term infants born vaginally following a manipulative delivery for malpresentatioin are at greater risk of perinatal asphyxia and birth trauma

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than those born vaginally as a vertex or delivered by cesarean section. For premature infants, labor itself may also contribute to perinatal asphyxia and intracranial hemorrhage, even when delivered as vertex.[1] Perinatal asphyxia and trauma from the birth process is a major preventable cause of perinatal morbidity and contributes to the incidence of cerebral palsy and other neurological disabilities. Cerebral palsy is four times as likely to follow twin than singleton birth. The association of low birth weight with perinatal asphyxia frequently leads to the respiratory distress syndrome with its complications during the neonatal period and later neurological sequelae.

Hence, it does appear that if one were to avoid perinatal asphyxia by avoiding obstetric manipulations in these low birth weight infants, one could practically eliminate later complications. The association and significance of low Apgar scores at one minute and five minutes with neurologic sequelae have been extensively discussed.[2,3]

This study reviews 91 twin gestations at New York Medical College and Metropolitan Hospital Center during the period from January 1975 to June 1980 with respect to perinatal mortality and morbidity relating to mode of delivery of twins of both normal and low birth weights.

Materials and Methods

Between January 1975 and June 1980 there were 9,647 deliveries with 96 twin gestations, an incidence of 1:100. Ninety-one pairs of these twins could be analyzed, and insufficient data were available for others. The entire group is reviewed in terms of overall perinatal loss, and 79 twin pregnancies producing 158 infants weighing more than 1,000 grams are evaluated for immediate neonatal status. Stillborns are noted as they occurred.

All infants have been grouped in terms of weights in grams with increments of 500 grams up to 2,500 grams and over. Those weighing more than 1,000 grams and born alive have been grouped in terms of Apgar scores one through three, four through six, and seven through 10 to evaluate perinatal status as either "good" or "compromised."

All these infants are then described in terms of intrapartum presentations and mode of delivery. Newborn status is then displayed from the perspective of the mode of delivery of each weight group, emphasizing the status of the second twin, specifically of those weighing less than 2,500 grams.

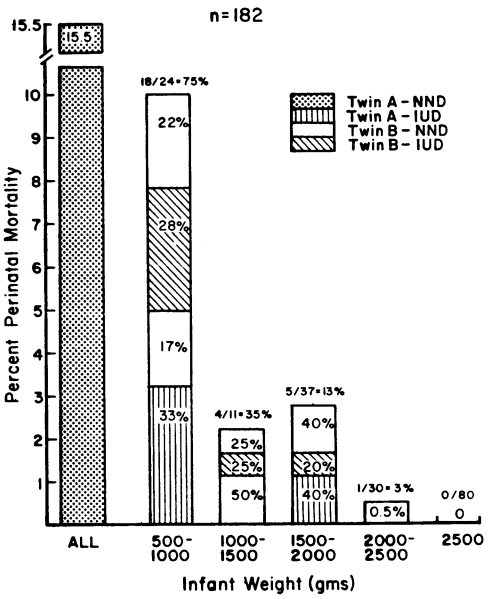

Fig. 1. Perinatal mortality (PM) of all twins in respect to birth weights. Those below 1,000 grams contributed to two thirds of the death rate. PNM of those more than 1,000 grams was 6.2%. Neonatal deaths in second twins were twice as high as in first twin.

RESULTS

Perinatal mortality: Overall perinatal mortality in the entire group of 91 pairs of twins with 182 infants was 15.5%. Ten percent of the overall mortality, or more than 65% of the total, was contributed by infants weighing less than 1,000 grams. Perinatal mortality in infants of 1,000 grams or more was 6.2% and is noteworthy. The component of this perinatal mortality in each weight group is seen in Figure 1. A total of 10 babies died, 4 were intrauterine fetal deaths, and 6 babies died neonatally. Most neonatal deaths occurred among infants weighing less than 2,500 grams, usually following the respiratory distress syndrome and related complications. Neonatal deaths among the second twins were twice as frequent as among first twins. Three of these four second twins had been delivered vaginally by manipulation, either by breech extraction or internal version-extraction. One death occurred among those weighing more than 2,500 grams was due to maternal preeclampsia.

The following data refer to babies weighing more than 1,000 grams.

Intrapartum presentation and position: The incidence of malpresentation of either one or the other twin was 60%. Forty percent of twin pairs

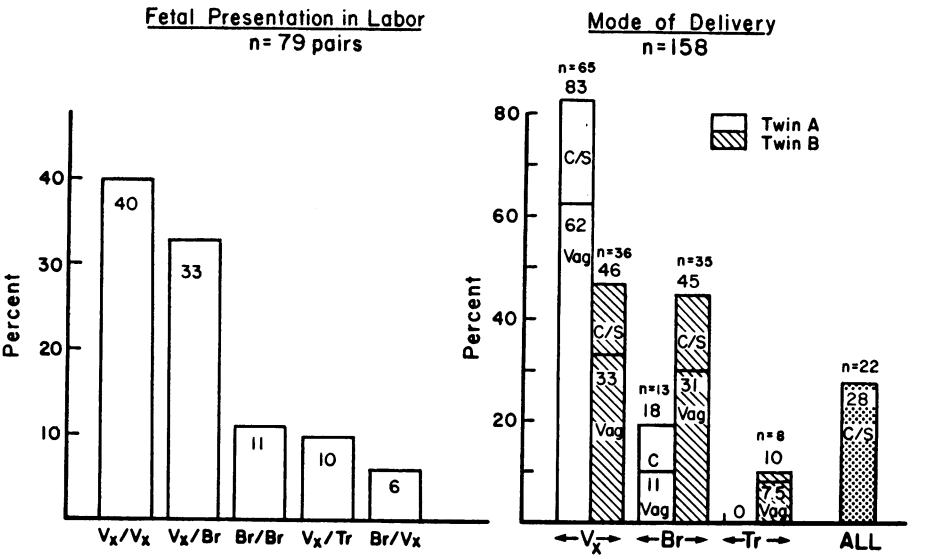

Fig. 2. Intrapartum presentation and position in those weighing more than 1,000 grams. Only 40% of all twins presented as vertex. Malpresentation of second twin was three times higher than first twin.

presented as vertex/vertex, 33% as vertex/breech, 11% as breech/breech, 10% as vertex/transverse, and 6% as breech/vertex (Figure 2). Eighty-three percent of the first twins presented as vertex, whereas only 46% of second twins presented as vertex, 45% as breech, and 10% as transverse lie.

Second twins clearly undergo hazardous deliveries. Thirty-one percent of them were delivered vaginally as breech and 7.5% were delivered following internal version and extraction. Only 33% were delivered as vertex and 11% as breech. The incidence of cesarean section was 28% for both twins (Figure 3).

Neonatal status. The incidence of babies having an Apgar score below seven at one minute was 21% and at five minutes was 11% in those weighing more than 1,000 grams. Sixty-five percent of the low one minute Apgar scores and 56% of low five minute Apgar scores occurred among the second twins (Figure 4).

The incidence of low Apgar scores in the general population of neonates is 10% at one minute and 2% at five minutes at Metropolitan Hospital.

The Apgar scores of first twins weighing more than 1,000 grams are

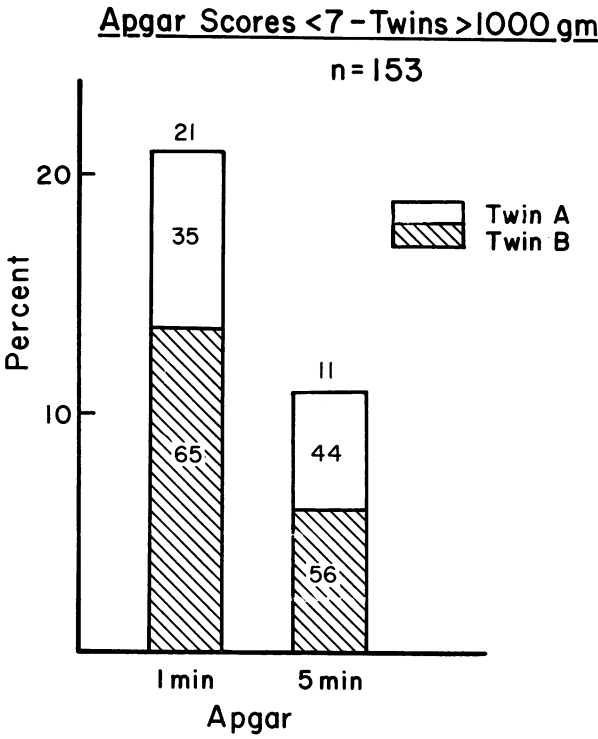

Fig. 3. Mode of delivery in twins. Thirty-eight percent of second twins underwent manipulative delivery, while only 11% of first twins underwent manipulative delivery.

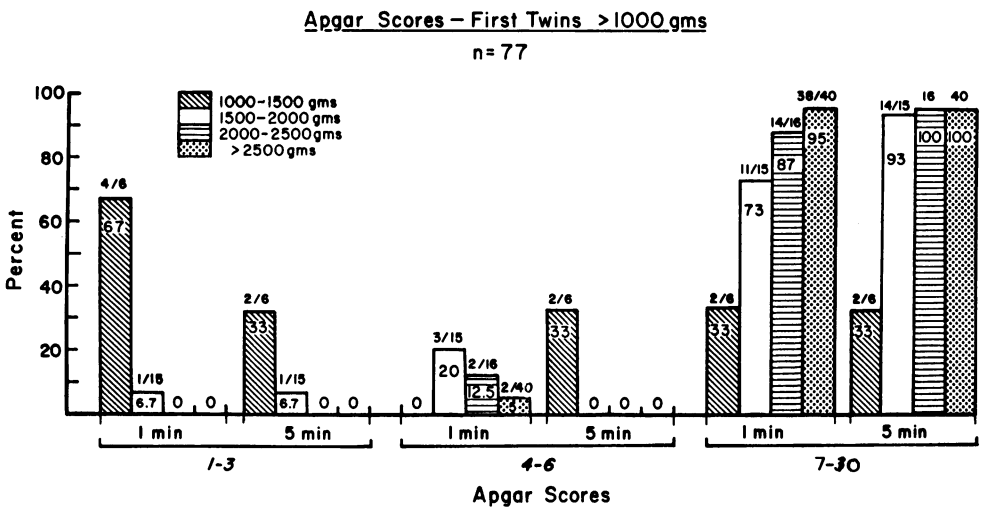

Fig. 4. Apgar scores at birth in all twins. More second twins have lower Apgars at one and five minutes than first twin.

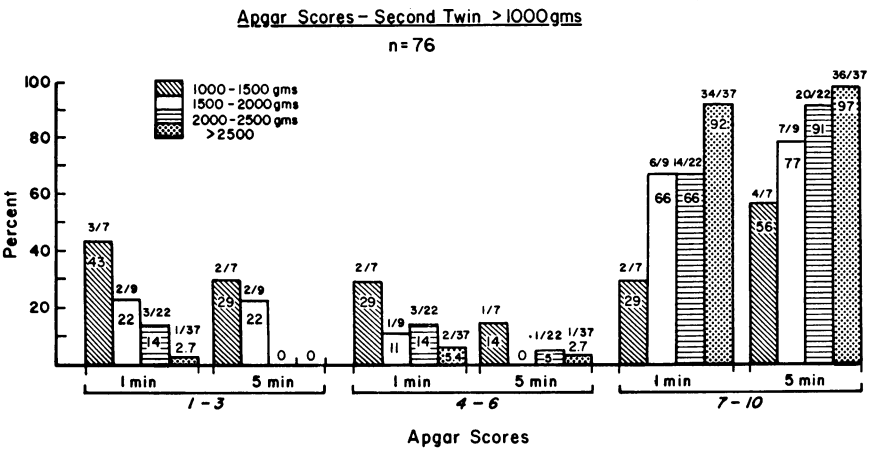

Fig. 5. Apgar scores of first twins weighing more than 1,000 grams. Incidence of lower Apgar scores appears to be weight related. Larger babies more than 1,500 grams are less likely to be asphyxiated regardless of the delivery process. Among those less than 1,500 grams, two thirds of the babies were asphyxiated.

seen in Figure 5. Seventy-seven of the 79 first twins were born alive, two antepartum fetal deaths. Apgar scores were high among those weighing more than 1,500 grams in more than 75% at one minute and more than 90% at five minutes. Of the babies weighing between 1,000 and 1,500 grams, only 33% had Apgar scores more than seven at one minute and at five minutes.

Apgar scores of second twins weighing more than 1,000 grams are seen in Figure 6. There were 76 live births, three antepartum fetal deaths. Only 29% of second twins weighing between 1,000 and 1,500 grams had good Apgar scores at one minute and 56% at five minutes. However, among those weighing between 1,500 and 2,000 grams, only 66% had good Apgar scores at one minute and 77% at five minutes. Apgar scores remain low among more second twins weighing 2,000 to 2,500 grams than among first born twins. Most of those weighing more than 2,500 grams were well at birth.

Apgar scores of all second twins were reviewed in terms of mode of delivery. More than 84% of those delivered by vertex vaginally had good scores at one minute and 92% at five minutes. No evidence of hypoxia or acidosis was found in any delivered by cesarean section, all of whom had optimal Apgar scores at birth. However, more than one third of those delivered vaginally, either by breech extraction or by internal version and

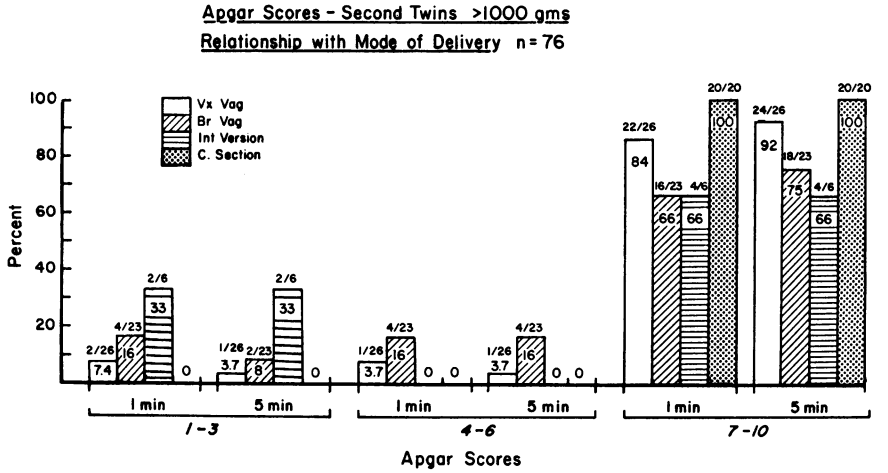

Fig. 6. Apgar scores of second twin weighing more than 1,000 grams. Even larger babies weighing > 1,500 grams are seen to be asphyxiated.

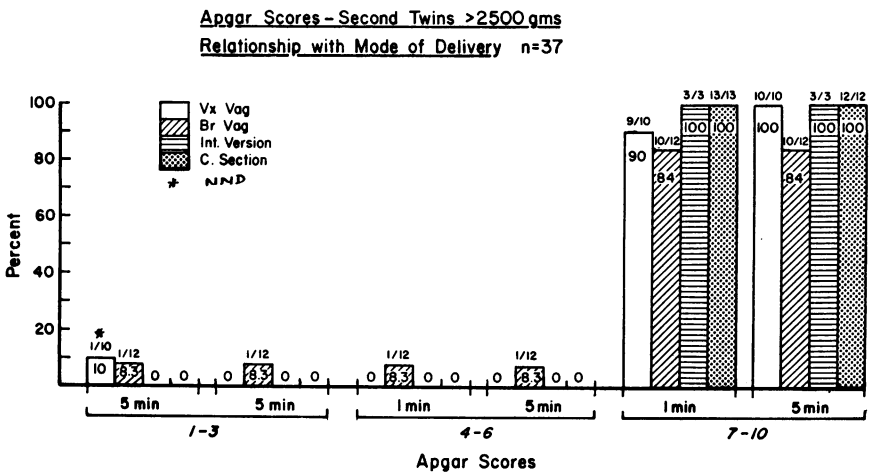

Fig. 7. Apgars scores of all second twins in relationship to mode of delivery. No low Apgar babies among cesarean section group. Most delivered as vertex did well. More than one third delivered following manipulative delivery were asphyxiated.

extraction, were asphyxiated at birth as evidenced by poor Apgar scores (Figure 7).

When second twins weighing more than 2,500 grams are reviewed, the outcome does not appear that bleak. Sixteen percent of those delivered as breech had scores less than seven at one minute and five minutes, and all

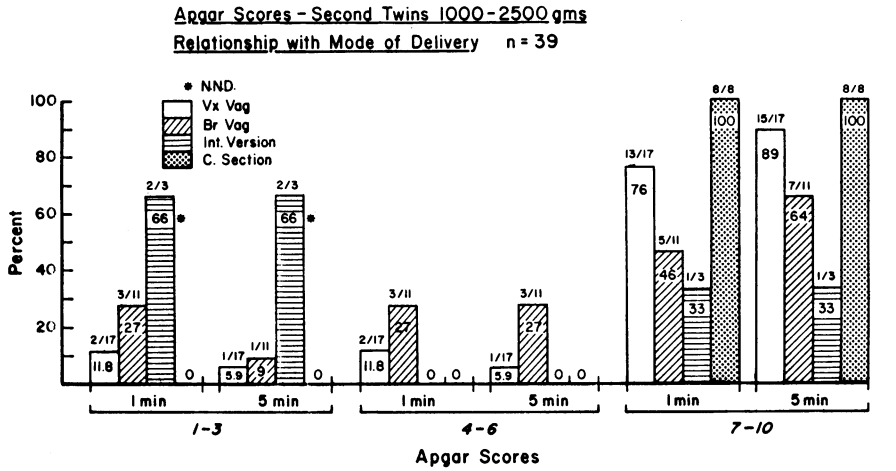

Fig. 8. Apgar scores of second twin > 2,500 grams in relation to mode of delivery. Most did well, except the two delivered as breech vaginally.

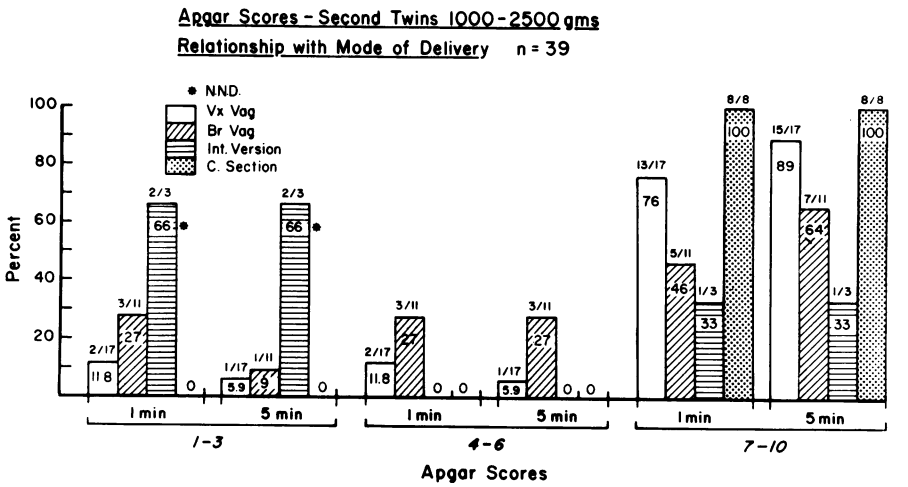

Fig. 9. Apgars scores of second twin < 2,500 grams. All cesarean section babies did well. One third of breech babies and two of the three internal version babies were severely asphyxiated. Three died neonatally.

other infants delivered vaginally either as vertex, internal version-extraction, or by cesarean section had good scores at one and five minutes. Only one baby delivered as vertex vaginally had a low Apgar score at one minute. This was attributable to maternal severe pre-eclampsia, and the baby died during the neonatal period (Figure 8).

The picture is quite different when second twins weighing between

1,000 and 2,500 grams are reviewed in terms of mode of delivery affecting the Apgar scores. All those delivered by cesarean section had good Apgar scores at one minute and five minutes. Among those delivered by vertex vaginally, 76% had scores more than seven at one minute and 89% at five minutes. However, among those delivered as breech vaginally, 27% were severely depressed at one minute with an Apgar score less than three, the other 27% were moderately depressed, and only 46% had one minute scores above seven. In fact, 36% remained depressed at five minutes. Among those delivered following internal version-extraction, two of three babies were severely depressed at birth, developed respiratory distress syndrome, and died within 48 hours of birth (Figure 9).

Discussion

The delivery process appears to be one of the major factors determining perinatal morbidity and mortality among twins. The second twin seems to bear the burden of this process and is liable to be jeopardized by cord and placental accidents and by the trauma of manipulative delivery for malpresentation. It has been well documented that approximately 54% of twins weigh less than 2,500 grams at birth and an equal number are born before 37 weeks.[4] When both twins are premature, labor and delivery process may be even more deleterious to these small babies.

The delivery process itself adversely affects second twins more than first twins because of frequency of malpresentation in second twins compared to first twins, increased likelihood of cord complications, and placental separation with consequent fetal asphyxia. Malpresentation of the second twin is approximately 50 to 60% as against 6 to 17% in the first twin.[5,8] Studies also demonstrate two to fivefold increase in perinatal mortality in breech delivery of twins, and that mortality is higher in the second twin.[7,8]

Obstetrical literature abounds with evidence of the increased death rate associated with manipulative delivery. In his study of 1,000 cases of twins, Farrell[6] found an uncorrected perinatal loss of 11.6% for the first twin and 20.5% for the second, and that the most lethal modes of twin birth were spontaneous breech delivery and internal version and breech extraction. He concluded that cesarean section and vacuum extraction had the lowest mortality rates.

In 333 twin deliveries, Farooqui[7] found the corrected perinatal mortality to be the same for the first as for the second twin. The delivery of the first

or second twin by breech was associated with a three to fivefold increase in perinatal mortality. Compound presentations added a factor of 10 times in perinatal mortality as compared to vertex presentation. Taylor[9] concluded that having two vertex presentations with a 5 to 15 minute interval between the first and the second twin is the best obstetrical approach. However, if one or both twins present by transverse lie or breech position, the best results will be obtained by cesarean section.

Apgar scores have been used for prognosis of the extent of newborn morbidity during the past few decades. However, the full significance of the one minute Apgar score is not fully understood at this point. Inability of a newborn to achieve adequate five minute Apgar scores certainly carries a poorer prognosis, even worse if associated with a low birth weight from prematurity or intrauterine growth retardation. Remarkable differences exist between the one minute Apgar scores of singletons and twin infants and between first and second twins. These differences certainly mandate re-evaluations of the delivery of these small babies along with other parameters of total care of multiple births. Among second twins, low birth weight and manipulative delivery contribute equally to increased morbidity and mortality as evidenced by low Apgar scores among babies of higher weight groups (1,500 to 2,000 grams). One third of a total of 29 second twins delivered either as breech or by internal version-extraction had evidence of hypoxia-asphyxia at one minute, and one fourth were still depressed at five minutes. All but one were from the low birth weight group. Many of these babies died during the early neonatal period.

Persistent perinatal asphyxia at five minutes in this highly vulnerable group of small babies is most undesirable, and is associated both with a stormy neonatal course and with long-term sequelae in those who survive. The benefit of abdominal delivery in small and second twins is indisputable because no babies so delivered were found to be depressed at birth, even those in low birth weight group.

Dunn[10] has stated that approximately 25% of multiple births are injured by such physician intervention as breech extraction or forceps delivery. Ware[11] has shown that with total breech extraction or version and extraction, 55% of second twins had poor one minute Apgar scores and similar results were noted by Cetrulo et al.[12] Sealy[13] noted more low Apgar scores among second twins. Twice as many second twins were delivered as breech than first and Sealy[13] attributed the low Apgar scores to manipulative delivery of the second twin. We therefore suggest that vaginal delivery in malpresentation of either twin poses a real threat of

asphyxia to these often small babies, and recommend cesarean section in all cases of malpresentation by either twin.

Our present study indicates that proper handling of term twin delivery in vertex/vertex presentation will result in perinatal survival matching that of vertex singleton delivery. The outcome of first twins appears to be related to birth weight and gestational age. For infants weighing more than 2,000 grams, delivery by vertex appears safe when labor is well monitored and vaginal delivery relatively atraumatic. However, for smaller babies weighing between 1,000 and 2,000 grams, vaginal delivery even from cephalic presentation may be dangerous. Our data demonstrate that of 21 babies weighing less than 2,000 and delivered as vertex, approximately one third were asphyxiated at birth. Gluck[14] and his group demonstrated that approximately 90% of babies below the 34th week of gestation have major or minor periventricular or intraventricular cerebral hemorrhage as a result of labor. Only 10% of small babies delivered without labor revealed evidence of hemorrhage. Developmentally, the subependymal germinal matrix persists until 34 weeks of gestation with persistent vascularity of the region. It is almost inevitable that these would rupture with any compression of the area. Low Apgar scores of small first and second twins are striking regardless of presentation. We recommend cesarean section for all viable twins less then 2,000 grams even in case of vertex/vertex presentation. Active labor should be avoided at all costs in very small infants.

Maternal complications leading to reduced uteroplacental perfusion such as hypertension, toxemia, diabetes, and abruptio produce intrapartum hypoxia, and in these cases cesarean section without labor will yield the best perinatal outcome.

Pudendal block for vaginal delivery and general anesthesia for cesarean section appears to be the safest anesthesia, and epidural anesthesia in our view does not appear to be the best choice in view of increased tendency to sympathetic block hypotension from vena-cava compression by the overdistended uterus. In addition, it may interfere with effective uterine contractions in patients highly vulnerable for dysfunctional labor. In case of unavoidable manipulative delivery, deep general anesthesia with halothane produces adequate uterine relaxation.[15]

Comprehensive antepartum management, including early diagnosis of multiple gestation,[16,17] bed rest from the beginning of the third trimester for six to eight weeks,[12,17-20] and nutritional care,[15] all improve perinatal outcome in multiple gestation.

Management of Labor and Delivery

Twin delivery should be conducted where neonatal intensive care is readily available. Initial laboratory workup includes complete blood count, urinalysis, basic chemical analyses (including SMA 18, including serum creatinine, BUN, uric acid and plasma proteins) and cross matching of two units of whole blood. We establish an intravenous line with a large bore needle infusing Ringer's lactate with 5% dextrose. Thereafter the presentation and position of both twins is established by physical examination and confirmed by roentgenograms of the abdomen. A tracing is obtained by external transducers to confirm and evaluate the fetal heart rates of both twins. If no abnormalities of fetal heart rates are detected, the following principles apply for further management of labor and delivery: Both twins presenting as vertex/vertex—trial of labor is allowed when gestational age is greater than 34 weeks, estimated fetal weight of each twin is more than 2,000 grams, and no other obstetrical indications warrant abdominal delivery. In the presence of malpresentation of either twin, cesarean section offers the best results.

Conduct of labor: The patient is encouraged to lie in left lateral position, and the heart rate of both twins is monitored electronically using two separate machines. The internal electrode is applied to the vertex of the first twin after membranes are ruptured, and an external transducer is used to monitor the second twin. Internal uterine pressure is monitored using a connecting pressure gauge. Small intravenous doses of Demerol are used for analgesia. Oxytocin is not recommended for induction or stimulation of labor. If uterine dysfunction or failure of descent of vertex occurs, cesarean section is performed.

Conduct of delivery: Anaesthesiology and neonatology teams are present in the delivery room which is equipped with instruments for emergency cesarean section. We favor pudendal block anaesthesia for routine delivery. Episiotomy is performed with crowning of the vertex. After the first twin has been delivered, vertex presentation of the second twin is confirmed. The second twin's heart rate is continuously monitored electronically by external transducer. If the heart rate is normal, spontaneous descent of the second twin is awaited, membranes are ruptured artificially, and spontaneous delivery of the baby is allowed. If the heart rate indicates fetal distress and the vertex is high, cesarean section can be performed.

If the second twin presents as a breech and the fetus is observed to descend rapidly, a gentle assisted breech delivery is allowed. If the second

twin is in transverse lie or presents as a breech and fails to descend and the heart rate is normal, cesarean section offers the best results. If the heart rate indicates acute fetal distress, internal-version-extraction or total breech extraction can be done under deep halothane anaesthesia. Proper cord clamping should include clamping of the maternal end of the first cord and identification of the maternal end of the second cord by two clamps. Immediate gross examination of the placenta to determine zygosity is done. The placenta is then submitted for pathologic examination.

If a decision is made to perform cesarean section for the above-stated indications, balanced general anesthesia with nitrous oxide and oxygen is preferred, a low vertical incision into the uterus is advisable to facilitate easy fetal manipulation, and both twins should be delivered as atraumatically as possible.

Comments: The second twin is a greater risk just by being born, in our view, because of malpresentation and the trauma of manipulative delivery. The risk to those of low birth weight appears to be greater than others. Our data suggest that twin delivery is a hazardous process because of frequent malpresentation of one or the other twin, and trauma from manipulative delivery and associated asphyxia is a major preventable cause of morbidity-mortality in twins. Vaginal breech delivery and internal version-extraction can be fatal for the second twin, particularly for the one with low birth weight. Morbidity-mortality in twins can be reduced by atraumatic delivery of both twins. Cesarean section for any malpresentation of either twin carries the lowest risk, particularly for these often small babies.

SUMMARY

A total of 91 pairs of twins were analyzed in terms of the effect of the intrapartum management of twin labor and delivery on the perinatal outcome. Overall perinatal loss was 15.5%, and two thirds of these deaths were infants weighing less than 1,000 grams, but a perinatal mortality of 6.2% among infants weighing 1,000 grams or more is noteworthy. Twenty-one percent of babies had an Apgar score less than seven at one minute and 11% at five minutes.

Seventy-nine pairs of twins weighing more than 1,000 grams had an incidence of malpresentation of either first or second twin of 60%. Eighty-three percent of the first twins presented as vertex, while only 44% of

second twins presented as vertex, 45% as breech, and 10% as transverse lie.

Sixty-two percent of first twins were delivered vaginally as vertex, and only 11% were delivered vaginally as breech. Only 33% of the second twins were delivered vaginally as vertex and 31% as breech. Eight percent of the second twins required internal version and breech extraction delivery. Overall, 28% twins were delivered by cesarean section, the most common indication being malpresentation.

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